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R. W. SPERRY, Harvard Biological Laboratories. Reestablishment of visuomotor coordinations by optic nerve regeneration.

In 58 adult newts (Triturus viridescens) the eyeball was rotated 180 degrees and the optic nerve was severed in different ways designed to favor random reassortment of the regenerating fibers. Recovery of reactions to visual stimuli occurred within 28 to 95 days. Reversal of vision conforming to the rotated position of the retina was clearly manifest in all cases, as indicated by deliberate reversed reactions, erroneous spatial localization, and other abnormalities of visuomotor coordination directly correlated with rotation of the retinal field. Thus the original functional values of various retinal loci were systematically restored when the fibers had reestablished connections with the visual centers. The reversed reactions persisted without modification by experience despite their decidedly maladaptive character.

These results indicate that the original functional properties of various retinal points are reestablished without aid of functional adaptation by the growth process itself, and furthermore that the optic fibers from different retinal loci are distinguished from each other in the centers according to location of their ganglion cell bodies in the retinal field, probably through differential physico-chemical properties induced in them by differentiation of the optic cup in development. The effect of this optic fiber specificity in determining orderly functional relations in the centers can be accounted for either on the basis of the Resonance Principle or alternatively in accordance with the author's hypothesis of peripheral induction of central connection specificity.